Svirezhev, Yu. M. Institute of Medical Radiology, Obninsk, USSR. Establishment of heterozygotic polymorphism in non-stationary populations.

In (1) the cases of heterozygotic polymorphism in the stationary model populations of D. melanogaster are considered. Dynamics of polymorphism establishment was described by monotonous curve p(t) of gene frequency, which approaches the constant value of polymorphic level $\mathcal{E}^*$ asymptotically. But in the experiments on the polymorphism establishment in populations, subject to temporal size changes (non-stationary populations), the non-monotonous change of p(t) was observed. Naturally, that the coefficients of relative viability are the functions of time, also. The case of a diallelic gene in panmictic population, which increases in size with time (so that $N(t) \to N^*$ for $t \to \infty$), is considered. N(t) is a population size. Let $\beta \to \beta^*$, $\gamma \to \gamma^*$, $\mathcal{E} \to \mathcal{E}^*$ for $t \to \infty$. Here β and γ are the coefficients of relative viability (1) of genotypes Aa (heterozygote) and aa (mutant homozygote) accordingly. And let the sufficient conditions of heterozygotic polymorphism existence be fulfilled. Then: if $p(o) < \mathcal{E}(0)$, $\frac{d\beta}{dt}(\gamma-1) - \frac{d\gamma}{dt}(\beta-1) < 0$ $[0 < t < \infty]$ then the curve p(t) raises over the level $\mathcal{E}^*$ and then descends, approaching $\mathcal{E}^*$ from above asymptotically; if $p(o) > \mathcal{E}(0)$, $\frac{d\beta}{dt}(\gamma-1) - \frac{d\gamma}{dt}(\beta-1) > 0$, $[0 < t < \infty]$ then the curve p(t) descends lower than the level $\mathcal{E}^*$ and then raises, approaching $\mathcal{E}^*$ from below asymptotically.

If the population size, and consequently, the coefficients of relative viability, oscillated with the frequency ω about some stationary level, then the amplitude of oscillations of the gene frequency is inversely proportional to ω, and, for high frequency of oscillations, is very small.

Reference: 1. Yu.M.Svirezhev, N.W. Timofeeff-Ressovsky, "On the equilibrium of genotypes in model populations of D. melanogaster," Problemy kibernetiki (Russ.), 16,p.p.123-136, 1966.

Khishin, A. F. and Mokhtar M. Zawahri. Assuit University, Egypt. The effect of yeast concentration on the X-ray induced lethal mutations in D. melanogaster.

A set of experiments was carried out to study the effects of yeast concentration in the media on the X-ray induced recessive sex-linked lethal mutations in the different stages of developing male germ cells of D. melanogaster. Three different yeast percentages were used, and this was applied before, after, or before and after irradiation. Larvae were also fed on different yeast concentration before and after irradiation. The Muller-5 method was used for the determination of mutation rates.

The results given in the Tables below show that starvation of adult males before or before and after irradiation increases the genetic effects of radiation. Irradiation of starved larvae during the actively feeding stage, followed by post-irradiation starvation results in a significant reduction in the frequency of lethals.

Table 1. Recessive sex-linked lethal induced by 2532r units of X-rays in adults males of D. melanogaster fed for 3 days on different yeast concentration.

FEEDING TREATMENT

	Pre-irradiation			Post-irradiation			Pre-and post-irrad.		
Yeast %	4	0	10	4	0	10	4	0	10
Lethals %	7.06	7.95	6.86	7.27	6.85	5.79	7.01	7.27	6.00

Table 2. Recessive sex linked lethals induced by 1176r units of X-rays in 48 hours-old D. melanogaster larvae raised on different yeast concentration.

Yeast %	4	0.5	10
Lethals %	1.59	0.97	1.82